AMSAT News Service Weekly Bulletins
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SB SAT @ AMSAT $ANS-166.01
MIREX INFO/MIR FREQ. CHANGE

HR AMSAT NEWS SERVICE BULLETIN 166.01 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.01

To: Amateur Radio Stations
From: MIREX Mir International Amateur Radio Experiment
Subject: Mir Frequency change experiment
Date: June 13, 1997

A frequency change experiment is tentatively scheduled to take place the weekend of June 15th at 1200 UTC with the 2-meter station on board the Mir Space Station. The duration of the experiment has not been finalized, we would like your inputs on the results. The MIREX team has received numerous
complaints from around the world, stating the existing Mir 2-meter channels

are not usable. In November 1996 Mir changed from the successful channel 145.550 simplex to a 145.200/800 split frequency. This combination of channels (145.200/800) does not work very well for most parts of the world. In many countries the 145.200 is used for repeater Outputs or Inputs. The 145.790 channel is in use by many semi-permanent packet operations. The new temporary frequency which MIREX has requested is 145.985 Simplex. All operations, Voice and Packet will be on 145.985 Simplex. This frequency was chosen for three primary reasons. First it complies with the ITU International Band plan for Satellite operations. Second, It gets Mir away from most of the terrestrial based interference. Third, The Mir 2-meter station is desensed by commercial VHF activities on board Mir (in the 143 MHz range).

Stations are encouraged to listen to the Mir activities on the new channel and send your Signal and Interference reports to the CEO of MIREX, Dave Larsen. It is very important to participate and send reports. This is

an opportunity to provide useful input.
Address:
E-mail doc @ volcano.net
Packet n6co @ N0ARY.#NOCAL.CA.USA.NOAM
Postal N6CO POB1501 PINE GROVE CA 95665

Please do not send Signals reports via the Mir PMS mail box. And do not bother the Mir crew members about the frequency change. This frequency experiment is solely the responsibility of the MIREX Working Group. The MIREX Working Group would like the thank all of the people involved with assisting in this information gathering experiment, including the Mir 23 Crew members and the Chief of Cosmonaut Amateur Radio Department RSC.

Suggested Report format: (pre-amps turned off, state antenna style, then describe interference if any)

```
Elevation Degrees /  S-Unit
5    5
10   9
30   +10
50   +20
30   8
10   6
5   2
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[ANS thanks Dave Larsen, N6CO/K6MIR, for this news about MIR,.]

/EX

SB SAT @ AMSAT $ANS-166.02
SCHOOLS ON STS-94 SAREX

HR AMSAT NEWS SERVICE BULLETIN 166.02 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.02

Thanks to SAREX--the Shuttle Amateur Radio EXperiment--students at 17 schools, including one in the People's Republic of China, are scheduled to talk with the astronauts on the upcoming STS-94 mission aboard the shuttle Columbia. STS-94 is a ''refly'' of the April STS-83 mission that had to be cut short when a problem developed in one of the shuttle's fuel cells. STS-94 is set to launch on July 1. During the earlier mission, Columbia prematurely returned to Earth April 8 without making any of the scheduled SAREX QSOs. Most of the schools on the earlier schedule remain on tap for the July mission, which will again carry the microgravity science lab. Three hams are among the STS-94 crew members. They are Jim Halsell, KC5RNI, the mission commander; Janice Voss, KC5BTK; and Donald Thomas, KC5FVF.

Under the SAREX program, students at each of the selected schools ask questions of the astronauts during the contact. The primary goal of SAREX is to excite students' interest in learning.

Schools selected by the SAREX Working Group for a ham radio contact during this mission include: Mountain View Elementary School, Prescott Valley, Arizona; Center Street School, El Segundo, California; Ione Junior High School, Jackson, California; Foursquare Radio Amateur Youth, Oxnard, California; Crittenden Middle School, Mountain View, California; Robert J. Burch Elementary School, Tyrone, Georgia; Edgewater High School, Orlando, Florida; Lexington Traditional Magnet School, Lexington, Kentucky; Discovery Place Inc, Charlotte, North Carolina; Lawrence Intermediate School, Lawrenceville, New Jersey; Yeso Elementary School, Artesia, New Mexico; Public School No 9, New York, New York; Du Bois Middle School, Du Bois, Pennsylvania; Dunn's Corners Elementary School, Westerly, Rhode Island; Alvin C. York Agricultural Institute, Jamestown, Tennessee; S.J. Davis Middle School, San Antonio, Texas; and Tsinghua University, Beijing, People's Republic of China.

During most SAREX missions, many of the crew members will make random contacts with earth-bound hams. This crew will use KC5RNI, KC5BTK and KC5FVF on FM voice and W5RRR-1 on packet. They make these contacts during their breaks, before and after meal time, and during their pre-sleep time. In fact, over the past years the astronauts have contacted thousands of amateurs around the world. On many missions, they have even carried a 2-meter packet radio station. Innovative computer software allows the crew to operate the packet gear in an ''unattended'' mode, allowing amateurs to make contacts with the ROBOT station when the astronauts are working or sleeping.

The SAREX Working Group has designated the following frequencies during this mission. FM voice downlink (worldwide): 145.55 MHz; FM voice uplink (except Europe): 144.91, 144.93, 144.95, 144.97, and 144.99 MHz; FM voice uplink (Europe only): 144.70, 144.75, and 144.80 MHz; FM packet downlink: 145.55 MHz; FM packet uplink: 144.49 MHz.

Hams should avoid transmitting on the shuttle's downlink frequencies. The uplink is your transmitting frequency. The crew will not favor any uplink frequency, so your ability to communicate with SAREX will be the ''luck of the draw.'' Transmit only when the shuttle is within range of your station, and when the shuttle's station is on-the-air.

QSLs go to ARRL EAD, STS-94 QSL, 225 Main St, Newington, CT 06111-1494. Include the following information in your QSL or report: STS-94, date, time in UTC, frequency and mode (FM, voice or packet). You must also include a business-sized SASE.

Additional STS-94 mission information is available from NASA at the NASA Shuttle Web site, http://shuttle.nasa.gov.

During the mission STS-94 SAREX information, including the latest bulletins, Keplerian elements, and rise and set times, can be obtained on the SAREX Web Page http://www.nasa.gov/sarex/sarex.html"

[ANS thanks the ARRL for this report on STS-94.]

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SB SAT @ AMSAT $ANS-166.03
P3D MILESTONES REACHED

HR AMSAT NEWS SERVICE BULLETIN 166.03 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.03

Regular users of FO-20 may have been puzzled by a strange buzzing sound on its mode JA transponder over the last couple of weeks. This was due to command stations testing the new P3D Range Determination software and hardware. P3D's orbit will change significantly after motor firings, and NORAD will lose track of us. So would we! The P3 ranging system enables our world wide network of Command Stations to measure distance to the satellite from different locations and at different times and so compute the new orbit's keplerian elements. This information is used by us, the AMSAT community, and of course given back to NORAD so that they can re-acquire our satellite by radar. This methodology was used to remarkable

effect in picking up Oscar-13 after both its motor firings.

Back in 1988, the P3C engineering software was still based on the Atari-800XL computer. This was a legacy from the very successful designs originating as far back as 1979 and the ill-fated P3A satellite (1981). However the prospect of working on P3D yet again using a dual audio cassettes for storage and 8-bit 2 MHz processors has never been very attractive, and a re-engineering of many of the tools has been undertaken by James Miller, G3RUH, over the last couple of years. The P3 Range Determination package marks the successful completion of a substantial development program that includes the following principal packages:

- Tracking
- Telemetry Display
- Command Uploader
- IPS-X1802
- Ranging

- OrbitFit

Tracking of course needs no introduction.
Telemetry Display is essentially as already available for AO-13, but with P3D specific changes. This will be publicly released for several platforms

when P3D is finally "nailed down". Command Upload software is used for commanding the spacecraft both during lab-testing and in space. These first three packages were used for AO-13.

P3D, like its predecessors, has a flight computer based on a radiation hardened CDP-1802 microprocessor. It runs an operating system called IPS. But generation of the flight operating system and on-board control software is done on a ground-based host computer. The IPS-X1802 package is, as its name suggests, a cross compiler. Source files for P3D are written using the

IPS language. They are compiled by the IPS-X1802 development system (itself written in IPS) which outputs a target binary in 1802 machine code.

In the days of P3A/B/C, this compilation used to take half an hour on the Atari-800XL. Imagine how tedious a simple edit used to be. Flight software compilation, from source files to uploadable binary, now takes half a second. The IPS-X1802 cross-compiler is a major part of the P3D development program. Without it, the flight software which controls the spacecraft, and is much different than that of P3A/B/C, would be impossible

to produce efficiently in the short timescale left to us.

The Ranging software, mentioned earlier, measures range to the satellite with a basic accuracy of about 150m (1 microsecond). Comparison of ranges measured via FO-20, with ranges displayed by regular tracking programs, shows agreement within 5 km, often better. During tests, signal strengths have been kept to the absolute minimum needed for "lock", and are weaker than AO-13's general beacon used to be. The uplink power to FO-20 is typically under 1 watt to a KLM14C antenna, rather less than a typical SSB user's. The ranging software can track down to a level where the signal is

virtually inaudible. Sample GIF (5 Kbytes) taken during an FO-20 pass is at: http://www.jrmiller.demon.co.uk/IPS/range.gif

The final program OrbitFit takes range measurements from the network of command stations, and computes an orbit that best fits the data. It was written 10 years ago by Stefan Eckart, DL2MDL, and has been adapted for our current needs by G3RUH. Tests processing FO-20 ranging data have been completely successful. Software is written in Basic and ARM assembler for the Acorn Risc Computer. Current machines use the DEC SA-110 processor at typ. 200 MHz/700 mW/$50, highest MIPs/mW and MIPs/$$ (taken together) in the business and currently the embedded systems processor of choice. Makes

a cool personal computer too. Acorn Risc Computer:
http://www.acorn.co.uk/acorn/products/strongarm/

DEC SA-110 information:
http://www.europe.digital.com/info/semiconductor/sa110.htm

Software is not as photogenic or as sexy as hardware, and thus gets little or no exposure. Yet Miller hopes this short precis gives an idea of how the
backroom boys have been keeping busy. There are many such heroes in the P3D program, but G3RUH will just cite fellow P3D command stations Peter Guelzow DB2OS, Graham Ratcliff VK5AGR, Stacey Mills W4SM and Ian Ashley ZL1AOX for enthusiastically thrashing every development as it has staggered

off the production line.

[ANS thanks James Miller, G3RUH, for this information.]

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SB SAT @ AMSAT $ANS-166.04
40th ANNIVERSARY of SPUTNIK 1

HR AMSAT NEWS SERVICE BULLETIN 166.04 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.04

On October 4th 1957 Russia launched the worlds first man made satellite Sputnik 1. Its CW signals on 20 MHz and 40 KHz were heard by radio amateurs around the world.

Join in celebrating this fine achievement. The club call, M1ASE, (Amateur Satellite Experimenters) will be on air for 24 hours on October 4th 1997. Activity will continue throughout the month and into November ending at 2359 UTC on November 3rd, the date of the 40th anniversary of the launch of Sputnik 2.

M1ASE will be active in voice mode on all of the available analogue sats. concentrating on the Russian satellites RS-10, RS-12, RS-15, RS-16. There will be an SWL award, special QSL cards and an award certificate when you work us on more than one satellite. Make a note in the shack diary and look out for further bulletins nearer the event.

[ANS thanks John Heath, G7HIA, FOR THIS UPDATE.]

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SB SAT @ AMSAT $ANS-166.05
KF0JT SK

HR AMSAT NEWS SERVICE BULLETIN 166.05 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-16605

It is with sadness that ANS reports the death of Dennis Caton, KF0JT, author
of UP/DOWN. Dennis lost a three year battle with cancer June 4 at his home near Colorado Springs. He was a native of England and is survived by his wife and two grown children. Dennis was a long time supporter of AMSAT and satellite projects. For a time he was AMSAT's coordinator for activities at the Air Force Academy. When he hit upon the idea for the UP/DOWN program

he was delighted to have found a way to contribute to AMSAT and satellite operations. A service will be held at Our Lady of The Pines in Black Forest, Colorado on June 11. Messages may be sent to Jim White, WD0E (wd0e@amsat.org) for forwarding to the family.

[Jim White, WD0E reports this sad news.]

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SB SAT @ AMSAT $ANS-166.06
A0-10 INFO

HR AMSAT NEWS SERVICE BULLETIN 166.06 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT

BID: $ANS-166.06

Several people have asked about when AMSAT might be able to discern
AO-10's current attitude, illumination. Stacey E. Mills, W4SM, has
run some routines and put this information on one of his web pages, along
with a lot of other AO-10 related stuff, FAQ's etc at:

http://www.cstone.net/~w4sm/AO-10.html

As time permits, Stacey will update this with some more historical
information. The information regarding attitude must be taken with a large
"grain of salt", but it's based on what little he can determine. It's
interesting to postulate how AO-10's attitude may have changed fairly
dramatically in the last few months.

Stacey E. Mills, W4SM,

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SB SAT @ AMSAT $ANS-166.07
WEEKLY SATELLITE REPORT PT 1

HR AMSAT NEWS SERVICE BULLETIN 166.07 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.07

MIR:
(All operations, Voice and Packet will be on 145.985 MHz, Simplex FM)
[ANS thanks Dave Larsen, N6CO/K6MIR, for this report}

RS-10
(Uplink 145.865-145.905 MHz CW/SSB, Downlink 29.36-29.4 MHz CW/SSB)
RS-10 Still silent.
RS3A needs some SWL reports of RS-10.
What time you heard RS-10, and also the date.
Send info via packet to Andy, .RS3A.
Packet: RK3KPK@RA3KP.MSK.RUS.EU

RS-12
(Uplink 21.21-21.25 MHz CW/SSB, Downlink 29.41-29.45 MHz or
145.91-145.95 Mhz CW/SSB)
Signals on RS-12 in North America during May and June (almost
exclusively daylight passes) are weakened by increased ionospheric
activity which is keeping 15m active during the daylight hours.
This makes it especially important for the 'old timers' to warn the
newcomers on RS-12 to set their uplink frequency and leave it alone to
prevent sweeping across the 15m band and QRM-ing the terrestrial QSOs
in progress
[ANS thanks Dick Montgomery, N3DV, for this update.]

RS-15
(Uplink 145.858-145.898 MHz CW/SSB, Downlink 29.354-29.394 MHz CW/SSB)
Be aware that RS-15 has battery charging problems. When the satellite is
in the dark it has low output power..
[ANS thanks Geoff Perry for this report.]
(Hint: If SSB doesn't work for you, try CW. CW is very easy
to hear on the downlink!)

RS-16
RS-16's 435.504 MHz beacon is active.
The transponder and the 10 meter beacons are not
active at this time.
70 cm beacon: RS16 ZEAA ZEJA ZEAA(AA is sent as one

characrer);P163,o0,n0,m0,l0,k7,j5,i7,h49,g0,f159,e8,d6,c8,b11,a7.

Transponder information on RS-16.
Uplink = 145.915 - 145.948 MHz
Downlink = 29.415 - 29.448 MHz
Beacons = 29.408 , 29.451 MHz
Pwr 29 MHz Down = 1.2 W /4 W

Beacon 1 = 435.504 MHz
Beacon 2 = 435.548 MHz
Pwr 435 MHz Beacons = 1.6 W
[ANS thanks Bernie Hall, WY4D, for this report.]

FO-20
(Uplink 145.9-146.0 MHz CW/LSB, Downlink 435.8-435.9
MHz CW/USB)
Operating normally. Strong downlink signal. Very busy
during passes over North America. Please remember to adjust the
higher frequency for doppler when the bird is in analog, JA, mode.
This means adjust the 70 cm frequency, the downlink, for doppler
shift. You do not have to adjust the 2 meter frequency, the uplink,
for doppler.

KO-23
(Uplink 145.85, 145.9 MHz FM, Downlink 435.175 MHz FM,
9600 Baud FSK.)
KO-23 operating normally.
The latest version of Fodtrack, (homebrew rotator controller software), can
be found on KO-23. This version corrects some of the bugs found on earlier
versions.

KO-25
(Uplink 145.980 MHz FM, Downlink 436.5 MHz FM,
9600 Baud FSK.)
KO-25 operating normally.
[ANS thanks Jim Weisenberger, AA7KC, for his reports on
KO-25 and KO-23.]

AO-27
(Uplink 145.85 MHz FM, Downlink:
436.792 MHz FM (As of April 1, 1997)
Operating normally.
AO-27 (1-Jun-1997- 10:58 UTC Orbit-19182)
The satellite is working normally over North America.
and Europe.
Current AO-27 schedule information can be found at
www.umbra.com

Tepr 4 = 32 counts 16 Minutes
Tepr 5 = 66 counts 18 Minutes
The Transmitter xtal is changing with time. From the first day AO-27
was in orbit the Transmit Frequency has been shifting lower. Many
have not checked the zero doppler frequency closely enough to see that it
is dropping. Every few months Michael Wyrick, N4USI, has to change
a setting that moves the freq. a KHz or so up in freq. This setting only
has a range of about 7 KHz total. This means that after a while Michael
can't compensate for the change and has to reset the setting back to zero.
This causes the freq. to drop about 7 KHz when he does this. There is not
a way around this and the Tx freq. will continue to drop as the xtal ages.

The satellite is coming up on the end of range for this setting and in
several months the freq. will seem to drop again. If N4USI had not put the

correction hardware on-board, you would see a continuous shift in tx

frequency. AO-27 Will turn on Every pass 16 Minutes after entering the sun and will stay on for 18 minutes. This corrects the early shut off that has been going on for the passed few weeks.
[ANS thanks Michael Wyrick, N4USI, AO-27 Control-op, for this update.]

FO-29
Voice/CW
(Uplink 145.9-146.0 MHz CW/LSB, Downlink 435.8-435.9 MHz CW/USB)
Digital
(Uplink 145.85, 145.87, 145.910 MHz FM, Downlink 435.910 MHz FM 9600 baud BPSK)
Please remember to adjust the
higher frequency for doppler when the bird is in analog, JA, mode.
This means adjust the 70 cm frequency, the downlink, for doppler
shift. You do not have to adjust the 2 meter frequency, the uplink,
for doppler.

The latest FO-29 Schedule can be found at.
http://www.kt.rim.or.jp/~jr1nvu/eindex.html
    June
         13(Fri) 00:39z JD 1200bps PSK MailBox
         20(Fri) 09:41z JD 9600bps FSK MailBox
         27(Fri) 00:11z JA
     July 4(Fri) 09:13z JD Digi-talker
          8(Fri) 09:06z JA
 [ANS thanks Kazu Sakamoto, JJ1WTK, for this report.]

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SB SAT @ AMSAT $ANS-166.08
WEEKLY SATELLITE REPORT PT 2

HR AMSAT NEWS SERVICE BULLETIN 166.08 FROM AMSAT HQ
SILVER SPRING, MD, JUNE 15, 1997
TO ALL RADIO AMATEURS BT
BID: $ANS-166.08

AO-10
 (Uplink 435.030-435.18 MHz CW/LSB, Downlink 145.975-145.825 MHz CW/USB)
 Rosario Orlando, IW9ELR, heard AO-10 during the evening of June 10th at 09.00 p.m. There was a QSO with I8CVS on 145.950 MHz.
.[ANS thanks Rosario Orlando, IW9ELR, for this report.]

OSCAR-11
(Downlink 145.825 MHz. FM, 1200 Baud PSK. Beacon 2401.500 MHz..)
Operating normally.
Telemetry nominal. The battery voltage has recently improved to around 13.9 volts, and the internal temperatures have continued to fall, due to solar eclipses. The battery temperature is now 4 degrees C, or 18 degree below the full sunlight condition.

The operating schedule is unchanged.
        ASCII status (210 seconds)
        ASCII bulletin (60 seconds)
        BINARY SEU (30 seconds)
        ASCII TLM (90 seconds)
        ASCII WOD (120 seconds)
        ASCII bulletin (60 seconds)
        BINARY ENG (30 seconds)

[ANS thanks Clive Wallis, G3CWV, for this information.]

AMSAT-OSCAR-16 (PACSAT)

(Uplink 145.9, 145.92, 145.94, 145.86 MHz FM, 1200 bps Manchester FSK
 Downlink 437.0513 MHz SSB, 1200 bps RC-BPSK 1200 Baud PSK.
Beacon 2401.1428 Mhz.)
The telemetry data received from the satellite show
a TX Out power of 0.442 Wtts.
Total Array C= 0.252 Bat Ch Cur=-0.024 Ifb= 0.040 I+10V= 0.280
TX:010B BCR:82 PWRC:59E BT:3C WC:25 EDAC:AC

Graphic information about WOD/Telemetry values can be found at:
http://www.arrakis.es/~ea1bcu/wod.htm
[ANS thanks Miguel A. Menendez, EA1BCU, for this report.]

DO-17(DOVE)
(Downlink 145.825 MHz FM, 1200 Baud AFSK.
Beacon 2401.220 MHz.)
WJ9F is continuing to work on reloading DOVE.
[ANS thanks Jim white, WD0E, DO-17 Command Team, for this news.]

WEBERSAT (WO-18)
(Downlink 437.104 MHz SSB, 1200 Baud PSK AX.25.)
Webersat (WO-18) is currently in MBL mode after a system
crash. The satellite appears to be in good condition broadcasting
MBL telemetry.
[ANS thanks Tommy Davis, IK3WVJ, for this report.]

LUSAT-OSCAR-19
(Uplink 1200 bps Manchester FSK Uplinks:
145.84, 145.86, 145.88, 145.9 MHz FM, Downlink 437.125 MHz SSB,
1200 bps RC-BPSK.)
Operational.
The telemetry data received of the satellite report
a spin rate/rev = 2 min.
With a rotation sense of the solar panels in
the magnetic north (+X, -Y, -X, +Y)

Graphic and general information about Telemetry values can be found at:
http://www.arrakis.es/~ea1bcu/lo19.htm
[ANS thanks Miguel A. Menendez, EA1BCU, for this report.]

UO-22:
(Uplink: 145.9 or 145.975 MHz FM. Downlink 435.120 MHz FM
9600 Baud FSK.)
A problem with UO-22 seems to be related to the software changes that
were made last week prior to the last flight software reload. During
the last pass over Surrey on Saturday morning, June 7th, Chris Jackson
closed the spacecraft store and forward communications system for general
use to allow him to diagnose the problem..
[ANS thanks Chris Jackson, G7UPN / ZL2TPO,
Groundstation and Operations Manager, for this report.]

IO-26 (ITAMSAT)
(Uplink 145.875, 145.9, 145.925, 145.95MHz FM, Downlink 435.822 MHz SSB,
1200 Baud PSK.)
IO-26 controllers report that the spacecraft is now in IHT mode. The new
ROBOT software is under currently undergoing tests. The beacon reports
that the digipeater is OFF and that the ROBOT is undergoing tests.
Controllers ask that groundstations please do not transmit on any of
the satellite's uplink frequencies for the time being.
[ANS thanks Daniele Piercarlo, IK2XRO, ITMSAT Command Station for this
report.]

[Please send your Satellite or News reports to ANS Editor B.J. Arts, WT0N,
via e-mail, at bjarts@the-bridge.net or to wt0n@amsat.org]

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